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Arsenical Poisoning in Domestic Animals.

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The employment of large quantities of arsenical compounds in horticulture and agriculture involves a number of fatalities yearly amongst domestic animals. The use of arsenic in horticulture originated in France with the insecticide Paris green, with which fruit trees infested with caterpillars were washed. In order to avoid the poisoning of bees, arsenical compounds (Paris green, calcium arsenate, lead arsenate) should only be used *before* the young leaves and flowers begin to open. Arsenical weed-killers consist of solutions of white arsenic (one to two per cent.) in aqueous caustic soda or soda ash, but these arsenical solutions do not appear to be appreciably more effective for the destruction of weeds than solutions of caustic soda or sodium carbonate. A five per cent. solution of washing soda in soapy water, or a one per cent. aqueous solution of caustic soda will give good results provided that the soil and air are moderately moist. The continued use of arsenical weed-killers is commonly followed by a plentiful crop of lichens, mosses and fungi.

In connection with sheep scab, the systematic dipping of sheep was made compulsory. The Board of Agriculture recommended three dips, two of which contained sulphur and one carbolic acid. It was pointed out that "the possible danger to human beings attendant upon the preparation of arsenical dips renders it advisable that they should be compounded by qualified persons only." The erection of boilers was necessary for boiling the lime and sulphur for the preparation of sulphur dips; the time and labour required for this operation led to the widespread use of arsenical dips, the preparation of which was more economical in time. Liquid cresol dips are more convenient; since heat is not required, they are less troublesome to prepare and are therefore gradually displacing the arsenical dips. Although usually very little arsenic reaches the skin in dipping (the greater part being retained by the outer portion of wool), damage has been caused occasionally by burning of the skin, sometimes by absorption through cuts or broken skin or by the dip being used too warm, and frequently by sheep feeding on herbage contaminated with drippings from recently dipped animals. It also seems probable that shock may be responsible for the deaths of a considerable number of sheep and lambs after they have been dipped.

Incidently, it may be remarked that cresol dips besides containing the declared percentage of tar acids should give a good uniform emulsion with water. Some dips examined by the writer gave mixtures from which oil separated on standing; such dips leave a tarry deposit on the wool. It should also be stated that some carbolic dips stain the wool yellow and thus depreciate its value. The author has encountered several cases of damage following the employment of cresol dips, but in no case have tar acids been detected in the stomach contents.

Derris eliptica is also used for making a sheep dip as a remedy against scab. This appears to have been used in China from time immemorial as an insecticide. It has found employment as a fish poison, as a fruit spray and for treatment of mange. It is less toxic to animals than arsenic or tar acids.

It is thus evident that arsenic is by no means indispensable in horticulture or agriculture and there would doubtless be considerable saving of animal life if its use were restricted.

Fatal intoxications are commonly due to acute poisoning caused by animals consuming weed-killer, sheep dip or fruit spray which has been carelessly used or left in places accessible to animals. Chronic poisoning is occasionally encountered by arsenical compounds slowly being washed into drinking ponds. The following cases are selected from those investigated by the writer; the specimens were submitted for analysis by veterinary surgeons, to whom the author's thanks are due for the descriptions of symptoms and *post-mortem* appearances.

Cattle.

Seven Friesian calves (seven months old) were observed to be scouring badly. One died 8 hours and another 20 hours after first showing symptoms. Acute inflammation of fourth stomach and duodenum; patches of acute inflammation of rumen and small intestine. Separated approx. $\frac{1}{30}$th part of a grain of arsenic per ounce of rumen contents and $\frac{1}{120}$th part of a grain per ounce of fourth stomach contents.

Six Short-horn bull stirks (3 to 12 months old) apparently healthy at night, were found dead next morning. The only unusual *post-mortem* appearance was congestion of the fourth stomach. From one ounce of the fourth stomach contents approx. $\frac{1}{10}$th part of a grain of arsenic was separated.

Six heifers died; two, showing similar symptoms, recovered. Diarrhœa, loss of appetite, staggering gait, painful grunt, temperature normal or sub-normal. Bacterial poisoning was suspected. From one ounce of fourth stomach contents $\frac{1}{60}$th part of a grain of arsenic was separated. The drinking water of the cattle was from a stagnant pool which was fed by surface water and stood amongst dumps from the workings of a small Cornish tin mine. The

water from the pond contained $\frac{1}{30}$th part of a grain of arsenic per fluid ounce.

A bullock died after exhibiting symptoms suggestive of poisoning—dribbling from mouth, profuse watery diarrhœa, pulse imperceptible, temperature 100°. From one ounce of stomach contents separated $\frac{1}{90}$th part of a grain of arsenic.

Several cows died near the Kent coast within twenty-four hours of the onset of symptoms. They exhibited acute abdominal pain, sweating, tympany, gritting of teeth, intense coldness of ears, udder and teats, extreme diarrhœa and inability to rise. The owner attributed the damage to salt poisoning owing to large quantities of sea water entering the dykes. The only unusual *post-mortem* appearance was inflammation of fourth stomach. Separated $\frac{1}{120}$th part of a grain of arsenic from one ounce of fourth stomach contents.

A cow, unable to rise and showing very severe intermittent muscular spasms, subsequently died. Separated $\frac{1}{60}$th part of a grain from one ounce of abomasum contents.

A cow showed symptoms of muscular tremors and incoordination of movement; the pulse was small and rapid, and there was diarrhœa and the temperature was 103°. *Post-mortem* examination revealed acute gastro-enteritis and pneumonia; liver was dark and slightly cirrhotic. Arsenic was found ($\frac{1}{45}$th grain per ounce of stomach contents). A sample of suspected water was found to contain 70 grains of arsenic per gallon.

A heifer died suddenly and it was feared that the water from roads which had been recently dressed with a weed-killer might have drained into the drinking water. Separated $\frac{1}{240}$th part of a grain of arsenic from one ounce of fourth stomach contents.

Some bullocks, the drinking water of which was pumped up from a Cornish tin mine were unthrifty. A sample of drinking water forwarded for analysis contained a sediment. The dried sediment contained 1½ per cent. of arsenic, but the water contained no arsenic in solution. It is thus very probable that the bullocks were suffering from chronic arsenical poisoning.

Sheep.

Nine sheep were found dead one morning and towards evening the death roll was thirty. The ailing sheep were dejected, stiff and breathing quickly. The rumen was very congested. Separated half a grain of arsenic from one ounce of rumen walls and a quarter of a grain from one ounce of rumen contents. The vehicle of the arsenic was sheep dip.

Four ewes died in an orchard after staggering, frothing at mouth and suffering from profuse diarrhœa. Separated $\frac{1}{60}$th part of a grain of arsenic per ounce of stomach contents, $\frac{1}{75}$th part of a grain per ounce of stomach walls, and $\frac{1}{90}$th part of a grain per ounce of liver.

About 500 lambs were dipped with an arsenical dip and within 24 hours 40 were dead. The stomach contents contained not more than $\frac{1}{600}$th part of a grain of arsenic per ounce and the liver not more than $\frac{1}{1000}$th part of a grain per ounce. The finding of these quantities did not support the hypothesis of arsenical poisoning.

Pigs.

A number of pigs had been fed on a fresh consignment of blues and separated milk. Within two or three hours several were vomiting and on the following day diarrhœa was noticed in many. of the animals. Six died on the next morning. Intense inflammation and thickening of the stomach walls were observed. Separated $\frac{1}{15}$th grain of arsenic per ounce of stomach contents.

Several pigs exhibited violent twitching of the hind quarters; a number appeared stiff and walked with difficulty. Respiration was hurried, pulse quick, temperature 102.6°, Rat poison had been laid down near a rubbish heap and a large number of rats were lying dead. Separated $\frac{1}{120}$th part of a grain of arsenic from one ounce of stomach and intestinal contents. The rat poison was found to contain nine per cent. of arsenic.

One of a number of pigs which died suddenly was found on *post-mortem* examination to show hæmorrhagic gastritis, slightly congested intestines and enlarged lymphatic glands. Arsenic was present in the stomach contents to the extent of $\frac{1}{45}$th part of a grain per ounce. The vehicle of the arsenic was subsequently found to be sheep dip.

Horses.

Two horses showed symptoms of dulness, rapid pulse, some diarrhœa and slavering at the mouth, but there was no abdominal pain. *Post-mortem* appearances: Slight gastro-enteritis, congestion of fauces, purple discoloration of buccal membrane. From one ounce of stomach contents $\frac{1}{8}$th part of a grain of arsenic was separated and from one ounce of liver $\frac{1}{30}$th part of a grain.

A four-year-old mare died after purging violently and a two-year-old filly died after purging for a week. Two colts also died. Debility with rapid wasting of flesh, diarrhœa and impaired appetite were observed. Arsenic was found in the stomachs and bowels.

Dogs.

A Cairn bitch was taken suddenly ill at noon showing signs of distress. There was frequent vomition, and at 4 p.m. she was in a state of semi collapse; temperature was subnormal and pulse imperceptible. Death took place at 7 p.m. From one ounce of the stomach walls $\frac{1}{10}$th part of a grain of arsenic was separated.

A dog, after vomiting and showing symptoms of pain and great prostration, died eight hours after the onset of symptoms. Separated $\frac{1}{30}$th part of a grain of arsenic from one ounce of stomach walls.

Poultry.

Four cockerels and a hen were found dead and another bird was observed to be quivering. Arsenic (half a grain per ounce) was found in the hen's crop

contents, in the gizzard contents ($\frac{1}{60}$th part of a grain) and in the liver ($\frac{1}{10}$th part of a grain).

Four fowl were found dead, although they were apparently normal one hour previously. From one ounce of a turkey's crop contents $\frac{1}{10}$th part of a grain of arsenic was separated and a similar proportion was found in the gizzard contents. From the whole of the gizzard contents of a duck $\frac{1}{15}$th part of a grain of arsenic was separated.

Ten fowls died within a few days showing no symptoms nor were there any obvious *post-mortem* lesions. Three grains of arsenic were separated from the crop contents of one of these birds.

It is hardly necessary to emphasise the importance of chemical analysis to the veterinarian in all cases of suspected poisoning. Chemical analysis is much less costly than litigation, in which a client may lose heavily, especially if his claim is based only on evidence of symptoms or *post-mortem* examination.

In conclusion, attention may be directed to the surprising quantities of arsenic sometimes found in fish. In 1923 a joint chemical and medical commission, appointed by the Swedish Government to investigate the question of arsenical poisoning, expressed the opinion that fish contained larger amounts of arsenic than had been hitherto suspected. Mr. A. Chaston Chapman, F.R.S. (*Analyst*. 1926, 51, 548) has recently determined the quantities of arsenic in crustaceous and shell fish. He found that mussels contained from 40 to 120 parts of arsenic per million parts of the edible portion; the latter figure corresponds with approximately $\frac{4}{5}$th of a grain per pound. These amounts are very high and Chapman suggests that this fact may not be unconnected with the occurrence of poisoning symptoms known as *mytilism* which frequently follow the eating of mussels. Again, lobsters were found to contain up to 40 parts of arsenic per million; it is suggested that the high proportion of arsenic may be the cause of gastric disturbances which sometimes follow the eating of lobster. Prawns contain from 40 to 170 parts of arsenic per million, that is to say up to $1\frac{1}{3}$ grains per pound. It appears probable that the arsenic is present in fish in the form of complex organic compounds which are less toxic than the simple inorganic arsenical preparations.

Hornless Shorthorns.

There has long been a breed of "Polled Durhams" in the United States of America, but Shorthorns without horns are something of a novelty in this country. It appears, from the *North British Agriculturist*, that a Forfarshire farmer has collected a few pure-bred Shorthorns that are naturally polled. The founder of the strange family is a cow of the old Wild Eyes tribe, bred by her owners and sired a Cruickshank bull. She is described as true to the best Shorthorn standard in every respect save horns. She is now five years old, and has had three calves, two bulls and a heifer. While the two bulls are normal, the heifer is hornless like the dam. The cattle referred to are registered in the Herd Book, so that apparently there is no question of alien blood to account for their peculiarity.—*The Times.*

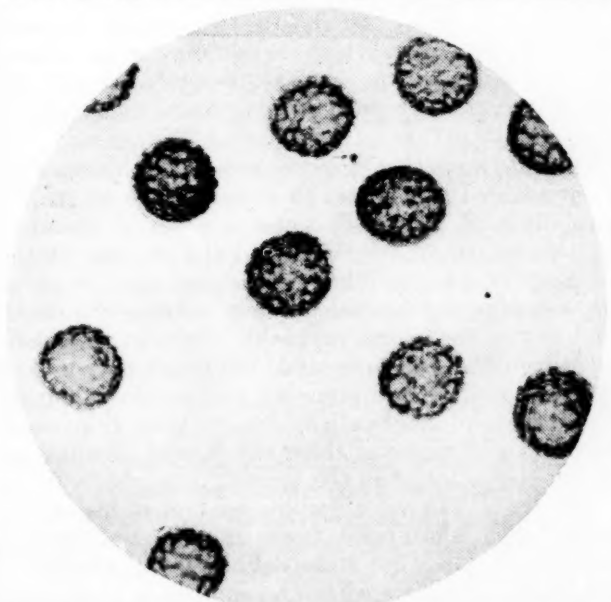
The Toxicity of the Spores of Tilletia Tritici to Animals*†

By Norman Dobson, B.Sc., M.R.C.V.S.

The possible toxicity of grain, damaged by bunt or smut (*i.e.* infected with the spores of *Tilletia Tritici* or *Ustilago* sp.) when fed to animals has been the subject of considerable controversy, and references in the literature which have a bearing on the point are peculiarly contradictory. The question, apart from its scientific interest, is one of considerable economic importance. In view of the fact that Professor J. Russell Greig had observed an apparent connection between the presence of the spores in the tissues of dogs and the occurrence of epileptiform convulsions in these animals (4) it was considered desirable that feeding experiments under strictly test conditions should be instituted. An application was therefore made by Dr. Malcolm Wilson and Professor Greig to the Board of Agriculture for Scotland for a grant in aid of the expenses of such research, and in June, 1924, I was entrusted with the prosecution of the work under their supervision.

By the kindness of Professor W. Wright Smith and Principal O. Charnock Bradley, adequate facilities were provided for the investigation at the Royal Botanic Garden and at the Royal (Dick) Veterinary College, Edinburgh, respectively.

Tubeuf (11) states (p. 306) that certain diseases are produced in animals by the consumption of spores of smut fungi with food and *Tilletia Tritici* is considered as one of the chief causes of these troubles. "The symptoms in the few cases of disease observed do not agree very closely. A paralyzing effect on the centres of deglutition and the spinal cord seems to be regularly present. As a result one generally finds a continuous chewing movement of the jaws, and a flow of saliva, also lameness, staggering, and falling. Cattle, sheep, swine, and horses are all liable to attack."



* Reprinted from the Transactions of the British Mycological Society, Vol. xi, Parts i and ii, 26 August, 1926.

† I am indebted to the Board of Agriculture for Scotland for a grant to defray the expenses of this research.

Liskum and Krastavizky (7) fed up to 10 grams of spores of *Tilletia Tritici*, and *Ustilago Maydis*, daily to guinea-pigs, mice, rabbits, and a dog. During the experiment no injurious effects were seen, and all the subjects developed more or less normally. *Post mortem* examinations, however, showed that all their organs were attacked by the spores, and partially destroyed. The typical symptoms noted were, hyperæmia of the digestive tract, dark or grey coloration of the mucous membrane of the intestines and stomach, and hyperæmia of lungs, kidney and brain. The spores were found to have accumulated especially in the adrenal bodies and the blood vessels were so full of the spores, that they sometimes burst from obstruction. In one case, the writers observed that they had penetrated the placenta, and reached the tissues of the foetus. It was noted that there was almost always a disproportion between the number of spores and the pathological changes. The conclusion arrived at was that the spores of *Tilletia Tritici* and *Ustilago Maydis* are injurious to animal organs, though their effects may not always be visible externally.

Lindau in Sorauer (9) doubts the toxic effects of the spores of *Tilletia Tritici*, as he quotes the records of Staes, who noted that a farmer regularly fed his horse and cattle with waste meal, in which a very large quantity of the spores was present. The meal was always soaked in water twenty-four hours before being used for feeding, and as this probably caused most of the spores to germinate they would be killed by passage through the intestines. Lindau evidently considers this a proof that the spores of *Tilletia Tritici* are not injurious to animal tissues. It would appear that he was mistaken in assuming that such immersion was sufficient for germination as Riehm (8) found that three or four days in diffused light at a temperature of 20°C. was required: direct sunlight or total darkness delayed germination, as also did temperatures below 20°C. In the present experiments it was found that in summer time under diffused light, at the ordinary temperature of the laboratory, six or seven days were required for germination.

It would seem that if spores were fed to animals in a germinated condition, there would be a greater possibility of any toxic substance being absorbed by the animal tissues, owing to the rupture of the hard spore case. When examining the fæces of the experimental animals, it was extremely rare to find any of the spores ruptured. Only in the specimens from the guinea-pig and the rabbits were broken spores found, and presumably this occurred during the process of mastication, due to their fine molar teeth. In no case was there any sign of germination of the spores found in the fæces.

Baudys (1, 2) gives a graphic account of his experiments upon white mice, fowls, rabbits, and himself, although he does not state definitely the weights of the spores administered to the animals or to himself. In view of negative *post mortem* findings, and the fact that he did not experience any discomfort from taking a feed of 9.5 grams of the smutted wheat mixed with wheat meal, he concluded that the spores are not poisonous. Klimmer (6, p. 138) refers to the work of Albrecht, "in a case where fifty-one head of cattle fed on wheat chaff infected with *Tilletia Caries*, *Puccinia graminis*, and *Ploespora herbarum*, eight beasts were taken ill, and three died." The symptoms were—spasms of the muscles of mastication, weakness with anæsthesia in the lumbar region, and fever; inflammation of the conjunctiva, mucous membrane of the nose, and upper air passages; urgent desire to urinate, and tenesmus; on *post mortem*, gastro-enteritis with erosion was found.

Greig (4), in 1922, published a report of three cases which he had attended of epileptiform convulsions in the dog, which appeared to be associated with the spores of *Tilletia Tritici*. "The symptoms were identical in each case. The animal was suddenly attacked by a series of convulsions, which continued for some hours, and terminated in coma; in two cases death resulted, but in the other case recovery took place, though the animal was subsequently destroyed."

In case *A* the fæces contained a very large number of spores of *Tilletia Tritici*. An examination of the abdominal organs was made *post mortem*, but no definite abnormality was found.

"In case *B* the fæces contained large numbers of the spores, which were found on *post mortem* to be present throughout the alimentary tract; they were also very numerous in the bile and urine, which in this case were examined microscopically. The brain unfortunately was not examined, and no definite microscopic lesion was discovered in any other organ.

"In case *C* spores were present in large numbers in the intestine and urine. No definite lesion was remarked until the cranium was opened, when an acute cerebral meningitis was observed; smear preparations from the cerebral cortex again revealed the presence of the spores. In sections cut from the brain, kidney, liver and spleen, the blood vessels were seen to contain very large numbers of dark pigmented bodies; these showed much variation in size, ranging from mere particles of pigment, to bodies 12μ in diameter; their nature is yet to be determined. Since the spores were so numerous in the urine, it was expected that they might also be present in the blood stream. No spores have, however, been seen in sections of tissue containing blood vessels, and it is possible that these pigmented bodies may represent spores in a state of disintegration; on the other hand, they may be mere artefacts."

Greig pointed out that the spores of *Tilletia Tritici* were frequently present in the fæces of normal dogs, but in many cases lengthy search was required before a single spore could be demonstrated, whereas in the fæces of affected cases, commonly six and not infrequently twelve spores could be seen in a single field. He suggested that although his material was insufficient to permit of any definite conclusion, it appeared probable that on occasion the spores of

Tilletia Tritici might constitute a factor in the production of epileptiform convulsions.

The preliminary work of the present investigation consisted in the examination of normal dogs with the object of determining the incidence of the spores of *Tilletia Tritici* in the alimentary tract. Three hundred and fifteen patients at the Royal (Dick) Veterinary College, were examined, and among these there was, of course, a wide diversity of breed. A large percentage were house dogs of the city, but there were also a large number of sporting dogs of various breeds.

Methods of Collection.

The method of collection chiefly consisted in direct removal of the fæces from the rectum. In some cases, where fæces had recently been passed in the kennel, a sample was taken from the centre of the stool, transferred to a sterile Petri dish, and emulsified in normal saline solution. With a glass rod, dropping the same quantity constantly, some of the emulsion was transferred to a microscopic slide, and covered with a $\frac{7}{8}$in. square cover slip. The entire $\frac{7}{8}$in. area was examined and a record kept of the number of the spores found. Two such preparations were made at each examination of fæces. During the early part of the experiment spores were found only in small quantities in the fæces, whereas towards the close of the feeding period the $\frac{7}{8}$in. area showed the presence of seven to eight hundred spores in almost every examination.

The dog was examined as early as possible after its arrival at the hospital, again on the second day after admission, and subsequently according to the length of time it was a patient in the hospital. Only in two cases were spores of *Tilletia Tritici* found in the fæces of new arrivals, whereas when the dogs had been in hospital two days, it was found that 26.6 per cent. were passing the spores in the fæces.

The bedding of the canine patients in the College consists of wheat straw and sawdust. Systematically on arrival of the wheat straw at the hospital from the forage merchant, washings were made and centrifuged. Examination of these microscopically showed the spores very often present, especially in the months of July and December, 1924, and during these months, examination of the fæces from the patients, showed heavy infestation. During the months of June, August, September, October, and November the washings of wheat straw showed a less gross infestation and the examination of the fæces showed a similar decrease.

Periodic microscopic examinations were made of the foodstuffs given to the dogs. The biscuits seemed a likely source of infection, but spores were not found in these. Washings of the coats of the dogs gave positive results, and large numbers of spores were found during the months of heavy infection of the bedding.

One therefore must assume that in these cases arriving at the hospital quite clear of infection and which in two days were found to be passing spores in their fæces, infection occurred through wheat straw contamination of food placed in a shallow bowl on the floor of the well-bedded kennel.

Experimental Animals: Housing and Feeding Arrangements.

Of three rooms at my disposal, in addition to the research laboratory, one room was utilised as a food preparation room, and the remaining two for the accommodation of the experimental animals. These were all admirable rooms, with concrete floors, washable walls, well lighted and ventilated. The experimental animals were two dogs, eight rabbits, eight guinea-pigs and, later, four fowls. The dogs were accommodated with benches well supplied with sawdust, and had the use of one room. The rabbits, guinea-pigs and fowls were kept in individual cages fitted with zinc trays, and a thick bedding of sawdust. The cages were placed on benches and one side of the cage was fitted with a zinc plate preventing the passage of food, etc., from one cage to the next. The dogs, rabbits and guinea-pigs were kept three weeks before the special feeding commenced, and the examination of the fæces during the whole period showed every animal to be quite free from infection with the spores of *Tilletia Tritici*.

Controls.

One rabbit and one guinea-pig were used as controls. They were kept under precisely similar conditions to those of the other animals, with the one exception, that they received no spores.

From the date of arrival of the animals until May 3rd, 1925 (a period of nineteen weeks), when the fowls had to be placed in the same room as the rabbits and the guinea-pigs, the fæces of the controls were quite free from spores. Periodical sweepings were taken from the ledges and window-sills and examined for spores but always with negative results until the arrival of the fowls, and then, presumably as a result of their constant scratching in the cages, spores were found very occasionally in the fæces of the controls and in the sweepings of the ledges, etc.

This condition might be contrasted with that prevailing in the workroom where the experimental animals were kept by Baudys (2). He describes the atmosphere as saturated with the spores, causing irritation to mucous membrane of nostril and sneezing.

Feeding Arrangements.

The food was prepared in the room specially set apart for the purpose. The ears of wheat were previously examined and bunted grain detached. The diet of the dogs consisted of unbroken biscuit in the early morning and at four o'clock in the afternoon they were given broken biscuits over which had been poured the liquid from boiled meat with a little minced meat added. This gave a moist mixture and with the aid of forceps the bunted grains were introduced under the surface of the food in the bowl and crushed, releasing the spores from the grain

without contaminating the atmosphere. The rabbits and guinea-pigs were given a few oats with greens and roots in the early morning; the afternoon feed consisted of moistened oats with the spores added as detailed in the case of the dogs.

Tabulated Results of Experiments.

1. Number of days the spores were fed to the animals.
2. Total quantity of spores fed (in grams).
3. Weight (in grams) of animals when special feeding began.
4. Gain or loss in weight (in grams) during the period.

Animal.	1	2	3	4	
Dogs.				Gain.	
DA	136	100·62	No facilities for weighing		
DB	137	103·57			
Rabbits.					
RA	14	·375	1558·6	259·8	
RB	142	54·00	1488·7	941·3	
RC	49	3·50	1671·8	147·2	
RD	107	15·007	1507·0	798·0	
RE	120	21·32	1464·4	719·4	
RF	149	85·00	1388·8	975·2	
RG	172	Control	1067·5	890·0	
RH	28	1·25	1499·5	108·8	
Guinea-pigs.					
PA	14	·375	435·2	40·4	
PB	162	Control	657·6	316·0	
PC	119	20·60	500·8	180·0	
PD	149	85·00	341·6	302·01	
PE	50	3·64	443·5	156·50	
PF	137	40·43	586·7	105·69	
PG	28	1·03	565·7	41·3	
PH	106	14·7	559·7	164·59	
Fowls.				Loss.	
FA	31	36·82	1040·54	52·54	
FB	52	207·00	1360·18	96·75	
FC	52	207·00	1476·13	48·67	
FD	19	11·80	1101·22	259·21	—Roup case.

CONDITION OF THE ANIMALS DURING THE EXPERIMENT.

The health of the dogs, rabbits, and the guinea-pigs was excellent throughout the period. The animals all gained weight and no abnormal symptoms were seen. All remained keen for food until the dosage reached five grams daily and then occasionally some inappetence was shown which could be attributed undoubtedly to the obnoxious, but very characteristic odour, of the *Tilletia Tritici* spores, the " herring brine " odour due to the presence of trimethylamin.

Four fowls were purchased on May 2nd, 1925, and as the fæces showed no sign of spores the special feeding commenced at once. Two of the fowls were fed with 10 grams of the spores of *Tilletia Tritici* per day for the ultimate fourteen days of the feeding experiment and showed no pathological symptoms. Fowl FD was killed on May 23rd owing to the occurrence of roup which developed on May 16th, after nineteen days special feeding: it showed the characteristic lesions on the comb, wattles and mucous membrance at the commissures of the mouth.

It is interesting to note that according to Heald (5) each smut ball contains from six to nine million spores. From experience it was found that the average of fifty-six smut balls to the gram was common and therefore the mass infection with the spores can be seen at a glance from the above table.

POST MORTEM FINDINGS.

The *post mortem* examinations revealed healthy organs in every case. In the animals that had been subjected to feeding for a month and more fat was found in the usual fat deposits in large quantities. Urinary and gall bladders, after ligature, were removed to sterile Petri dishes and here incised and the contents collected. Examinations of the bile and urine for spores in all cases proved negative. The stomach and intestines were quite normal, there were no petechiæ, hæmorrhagic patches or discoloration on the surface of the lungs or on any other serous membranes, and the kidneys, adrenals, spleen and brain were all normal. The blood was carefully examined, both from the heart and from the peripheral vessels, and found to be free from spores and no sign of rupture of the blood vessels was detected. Portions of the various organs were removed and fixed in Flemming's weak solution or in Pick's solution, passed through the usual processes, embedded in paraffin, and serial sections made and stained with Mayer's haem-alum. Examination of these sections proved entirely negative; the spores of *Tilletia Tritici* were not found in any cells, blood vessels, or embedded between tissue cells, in any organs, neither was any cell destruction found.

The only two animals that became pregnant were guinea-pig P.H and rabbit RF. Guinea-pig PH aborted on February 1st, 1925, after being under test since December 22nd, 1924, and must have been mated prior to this date. Rabbit RF was mated on May 1st, 1925, and destroyed June 11th, 1925, when five full-term young were found. In neither of these cases could the spores of *Tilletia Tritici* be found in the fœtal membrances or in the organs of the fœtuses. In all the fowls large deposits of fat were found and the liver in the cases FB and FC was slightly fatty, otherwise all the organs appeared quite normal. The tissues of the fowls were examined microscopically with negative results and in none of the organs was cell destruction visible.

From the foregoing and the table giving the increase in weight of the different animals, it will be seen that the non-appearance of pathological symptoms is quite compatible with the perfectly healthy condition of all the animals during the experiment, their general appearance of healthy vigorous condition in life and negative *post mortem* results.

The loss of weight in the fowls may be accounted for by the fact that they had previously been kept in a large run permitting all necessary exercise and, when confined in a large cage, with great lack of exercise and little scratching accommodation, although the food was suitable, loss in weight resulted but the condition of the organs remained healthy. The loss in weight is not to be attributed to any toxic effect of the spores, but rather to the fact that the condition of these birds suffered from their confinement. One must also remember that, for a period of fourteen days, they were consuming ten grams of the spores per day; these were devoured eagerly, although their food value was practically nil.

The question arises whether the spores which have passed through the alimentary tract are again capable of causing infection. Tubeuf (12) has shown that the passage through the alimentary tract destroys the germinating power of the spore and therefore manure contaminated with spores when spread on the land does not infect the crop. Baudys (1) also came to the same conclusion. Steglich (10) considers that danger from spores introduced with stall manure lasts but a few days because, as he asserts, manure acts as a stimulant to germination and thus causes the spores quickly to become innocuous in the absence of a host plant. Dreger (3) states that grain infection is perpetuated in the manure. Several experiments were made with the spores that had passed through the alimentary tracts of the various test animals during the investigation, but germination could not be induced.

Discussion and Conclusions.

Bunt of wheat has been known from very early times and is referred to by Theophrastus and other early Greek and Roman writers. Until 1775 it was believed to be caused by environmental or providential influences, but in that year Tillet proved its infective character by experiment. Much research has been carried out on the biology of this fungus and the subject still occupies a prominent position in economic botany. Under these circumstances if the feeding of the spores to animals had commonly proved injurious, one would expect that more precise records of its toxicity would have been made. The early records of Tubeuf (11) and the findings of Liskum and Krastavizky (7) and Greig (4), who either found that the spores had penetrated the tissues or noted pathological symptoms associated with the occurrence in feeding stuffs, still remain. A possible explanation of their observations may be found in the assumption that such effects as they noted resulted from the occasional presence of an unknown factor which allows of the absorption and penetration of the spores.

The result of this investigation, however, taking into account the lengthy period of the test, the large quantity of the spores administered, the invariable health of the animals throughout the entire experiment and the negative *post mortem* findings, justifies the conclusion that only in the most exceptional cases can the spores of *Tilletia Tritici* be regarded as injurious to animals. This is in agreement with the later work of Tubeuf (11). From the point of view of the practical stock feeder, it may be safely accepted that grain infected with bunt may be fed without injury to animals.

Acknowledgments.

My special thanks are due to Dr. Malcolm Wilson and Professor J. Russell Greig for their unfailing kindness to me whilst the experiments were in progress and for their assistance in the preparation of this paper. I should like also to express my gratitude to Professor E. S. Salmon, of the South-Eastern Agricultural College, Wye, who, through the instrumentality of Dr. Malcolm Wilson, kindly supplied all the bunted ears of wheat for this experimental work.

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Veterinary Dispensaries for the Poor in Galway.

"It is not uninteresting to mention what is being done for the congested districts by way of veterinary dispensaries and which may not be generally known outside these districts themselves," says the *Tuan Herald* of 5th February. "In the poorer parts of the nine congested areas subsidised Veterinary Surgeons are placed at the disposal of inhabitants with valuation not exceeding £10. The Surgeons are required to attend at fixed centres at least once a fortnight at prearranged houses advertised through the district. When required they must also attend at the residence of farmers entitled to the benefits of the scheme. The scale of fees run from a shilling per case, treated at headquarters or dispensary, to five shillings for severe operations when the owners valuation is over £5. No fee in any case exceeds five shillings unless the attendance is given after sunset when double fees may be charged. Medicines are supplied at reasonable prices and the Veterinary Surgeons may be called on to give public lectures on veterinary hygiene. Amongst all the schemes in operation possibly none calls for higher recommendation than this. It is quite unnecessary to dilate on such an appreciable boon to the poor agricultural areas of the country."

Diseases of Animals Bill.

Lord Bledisloe's Statement.

On the order for the second reading of the Diseases of Animals Bill, in the House of Lords on February 24th, Lord Bledisloe, Parliamentary Secretary to the Ministry of Agriculture, said the Bill was intended to tighten up and render more efficient the administration of the Ministry in relation to contagious animal diseases. The first clause carried out a recommendation of the Departmental Committee on foot-and-mouth disease which was presided over by Captain Pretyman, and provided for simplification of the procedure (which was set out in detail in the principal Act of 1894) which had to be followed on a place or an area being declared to be infected and, therefore, subject to restrictions, and again on such restrictions being ultimately removed. This procedure was cumbersome and out of date, and involved delay and unnecessary expense. It was proposed now to allow the Minister to prescribe this procedure by Departmental Order, as he already did in the case of swine fever with considerable success. Clause 2 had reference to cattle plague or rinderpest. As the law stood to-day, the Minister must give directions for the slaughter of all animals affected with cattle plague, and must insist on the slaughter, not merely of the affected animals, but of all those deemed to have been in contact with the affected animals in the same shed or otherwise. Fortunately, for the last 50 years, there had been no outbreak of cattle plague in this country, but at one period of the last century, it was our most serious animal disease. Several years ago a very effective immunising agent was discovered, which had been successfully employed in various parts of the world where cattle plague had broken out, and which rendered the slaughter of in-contact animals in the case of this disease quite unnecessary. The object of this clause was to permit the use of this immunising agent in the event, which they hoped might never occur, of an outbreak of cattle plague in this country, and so save a great waste of animal life and of public money.

A Curious Anomaly.

By Clause 3 the Minister was authorised to order the slaughter of all animals in an imported animals wharf or landing-place which were deemed to be affected with any contagious disease which rendered animals liable to slaughter. Under the present law the Minister had power to order slaughter in these places of animals affected by cattle plague, foot-and-mouth disease, and pleuro-pneumonia, but had no power to order the slaughter of animals affected with other serious contagious diseases, and, particularly, the scheduled forms of tuberculosis. It was a rather curious anomaly that local authorities had the power to order the slaughter of animals which were affected with the scheduled forms of tuberculosis, but the Minister of Agriculture had not that power in the case of animals which had come into the country and were detained at these landing-places or wharves. Clause 3 removed this anomaly. Clause 4 authorised an increase of the fees charged to importers where it was desirable that their animals should be detained in landing-places for inspection and testing. It was proposed, for example, to detain all horses imported, so that they might be tested with mallein, which had proved to be an effective means of preventing the spread of glanders or farcy, which used to be so serious among the horses of this country.

From the administrative point of view, the Ministry regarded Clause 5 as one of the most important in the Bill. The clause provided, also on the recommendation of the Pretyman Committee, that the maximum penalty in the case of offences against the Diseases of Animals Act should be increased so as to give the magistrates wider powers to deal with offences of a serious character. Of these offences, the most serious, in the view of the Ministry, was the neglect to report the existence of disease, and they had reason to believe that in recent years neglect on the part of stockowners to report outbreaks of disease had led to some of the more serious and widespread outbreaks. Neglect of that sort not merely exposed neighbouring stock to the risk of infection and loss, but it involved large public expenditure in stamping out the outbreaks which might have resulted from such concealment. The Bill provided for a maximum penalty of £50 or £5 per animal, whichever was the greater, and also for a fine of £10 per ton in the case of carcase litter, and so on. The passing of the clause would not affect the amount of penalty it was open to the magistrates to impose in minor cases, but would enable them to impose a more suitable penalty in the serious offences.

Foot-and-Mouth Disease.

It would be of interest if he gave the House some particulars of the present position in regard to foot-and-mouth disease. It was only fair to the extremely efficient veterinary staff of the Ministry of Agriculture to testify to the great value of their work and the reassuring results which had flowed from it during the last few months. In 1923 there were 1,929 outbreaks of foot-and-mouth disease, involving an expenditure of £2,205,000 of public money. That was the peak year. In 1924 there were 1,440 outbreaks and an expenditure of £1,389,000. In 1926 that number had shrunk to 204 outbreaks and an expenditure of £188,000. There had only been 19 outbreaks so far this year, compared with 39 during the corresponding period last year. The tracing of the Lanarkshire outbreak last May to Continental pig carcases had definitely established a previously unknown source of danger of infection of our stock.

It was really the most valuable discovery that had been made in connexion with contagious animals diseases for many years, and the Minister thought it desirable, as a result of it, to place an embargo upon fresh meat coming from the Continent, and their lordships would agree that that policy had been justified in the light of the figures in relation to this disease in Continental countries. In Germany there were no fewer than 187,500 outbreaks last year, as compared with 204 in Great Britain. That was a considerable increase over the previous two years, when the figures were 40,000 and 50,000 respectively. In Denmark the number of outbreaks in 1924 was 8,000, which rose in 1925 to 53,000, and last year to 97,400. The outbreaks in Holland in 1925 were 31,000, and they rose last year to 62,600. The outbreaks in Belgium during 1925 were 3,000, and they rose last year to 33,500—an enormous increase for a small country. In France the outbreaks in 1925 were 17,000, and last year they were no fewer than 48,900. He mentioned those figures to show that the policy which had been adopted as a result of the Lanarkshire outbreak had been a wise one and had protected this country effectively against the real danger arising from the prevalence of the disease in countries near our own shores.

Referring to the work which had been carried on during the last three years by the Foot-and-Mouth Disease Research Committee, Lord Bledisloe said a rather premature announcement had been made by two experts, both, he thought of German origin, in 1924 as to the supposed isolation of the micro-organism which was responsible for this disease. It had been demonstrated that those discoveries were not well founded. The labours of the Research Committee had resulted in their having regretfully to say that, so far, it had been quite impossible to cultivate this virus and so to secure an immunising serum. It had been discovered that in animal flesh the virus became inert within 24 hours after the slaughter of the animal; that in the case of blood the virus was still active at from 30 to 40 days after slaughter; and that, in the case of bone marrow, which they had suspected for some time past, the virus remained active at 76 days after slaughter.

The New Order.

A good many of the recent outbreaks of foot-and-mouth disease had been traced to consumption by pigs of slaughterhouse offal. At an early date, probably during the next 24 hours, an Order would be issued which would

compel those who used slaughter-house offal for the feeding of pigs to boil it or raise it to a certain temperature before giving it to animals.

Viscount Haldane, referring to Lord Bledisloe's statement regarding foot-and-mouth disease, said it was disappointing that the micro-organism had not yet been isolated, but something substantial had been achieved by the Committee in so far as they had succeeded in showing that the germ continued to exist in vitality according to the surroundings in which it was lodged. The provisions of the Bill appeared to be reasonable and to be designed to enforce the law more strictly.

The Bill was then read a second time.—*The Times.*

Dogs from Abroad.

THE SIX MONTHS' QUARANTINE.

The Times of February 23rd contained the following letter relative to the above:—

"To the Editor of *The Times.*

"Sir,—Will you allow us to express the feelings of many dog-lovers in England who, while recognising with gratitude the steps that have been taken to stamp out hydrophobia in this country, are anxious to see the laws of quarantine revised in some respects?

"The present sentence of six months' solitary confinement for all dogs coming into the country appears to us to be in the nature of a 'panic' regulation, and to be unnecessarily cruel both to the dogs and their owners. No dog can develop rabies except from the bite or saliva of a rabid dog, and therefore the vast majority of imported dogs are free from any possibility of infection. For purposes of safety, however, it must be assumed that every dog may have been bitten before entering the country. A dog that has been infected with this terrible disease normally develops symptoms of rabies within a month. It appears to us, therefore, that confinement for three months would be quite sufficient to ensure the safety of the public. An additional safeguard against an exceptional period of incubation might be provided by requiring the owners of the dogs to keep them confined on their own premises for a further period, and to produce a weekly certificate from a veterinary surgeon regarding their condition.

"We do not desire to dictate the precise modification which might be made in the present regulations, but we would urge the authorities to examine the experience which has been gained during the last nine or ten years and to consider whether some relaxation of the present rules might not be effected without increasing the danger of reintroducing a terrible disease which has been so effectually exterminated.

"We are, etc.,

"BLANCHE LLOYD. PAMELA LYTTON.
LAVINIA ANNALY. G. J. SCOVELL.
DOROTHY IRWIN. A. J. SEWELL."
GAY PLYMOUTH.

. . . . . .

We reproduce below the letter, which appeared in *The Times* on the following day, from the Minister of Agriculture and Fisheries:—

"To the Editor of *The Times.*

"Sir,—In your issue of to-day appears a letter which asks for a relaxation of the present quarantine regulations respecting the importation of dogs and suggests that the six months' detention now enforced is in the nature of a 'panic' regulation.

"It was in the light of experience that the period of detention was in 1918 increased from four to six months. As examples I may quote three cases of rabies developing in dogs detained in quarantine in 1924. In the first case, a dog from Egypt developed rabies three days after landing, and his history seemed to indicate that he had been bitten two months earlier. The second case, a dog from India, did not show symptoms until three months after landing and must therefore have been bitten at least four months before rabies appeared. In the third case, also from India, the disease appeared 5½ months after the dog had been in quarantine. These cases, which might be multiplied, show that six months' detention must be regarded as a minimum period to safeguard the country from the introduction of rabies.

"I have much sympathy with those travellers who find themselves separated from their dogs for so long a period, and I am aware how heavily the regulation presses on those dealers who import some of the fashionable breeds of foreign dogs. But, bearing in mind our comparatively recent experience of the disturbance to the well-being of all dogs and dog owners and the expense and danger to the community that are caused by an introduction of rabies, I cannot countenance any revision of our procedure which would add to the risk.

"Yours faithfully,

"WALTER GUINNESS.

"Ministry of Agriculture and Fisheries,
"10 Whitehall Place, S.W.1.
"*February 24th.*"

DRAUGHT HORSES.

The following appeared, under the above heading, as a leading article in the Saturday, February 25th, issue of *The Devon and Exeter Gazette*:—

"Not very long ago there was a considerable number of people who subscribed to the belief that the day of draught horses was for all practical purposes a thing of the past. And it must be confessed that the rapid development of the internal combustion engine was largely responsible for giving birth to that belief. The petrol-driven vehicle speedily proved its worth in many directions, and gradually drove the light horse off the streets and roads by reason of its swiftness, capacity for covering long distances, and extensive adaptability. Ultimately the motor tractor made its appearance, and, combined with its successful introduction to agricultural use in the vast areas in the Colonies, was regarded by some as ringing the knell of the Shire horse for farm purposes in this country. While not denying that the motor has many uses on hundreds of English farms, we believe that it is as far now as it ever was from ousting the heavy types of horses from the average English farm. Indeed, not only is the heavy haulage horse unlikely to be ousted from the sphere of agricultural activity, but there is evidence that it is re-establishing itself in the town.

"This week the Shire Horse Society's Show has been held in London, and a feature associated with it was a new class for entrants from those Metropolitan Borough Councils 'which have found it more economical to revert to horses for their street haulage!' What better tribute could there be than this to the value of the heavy work horse? The motor and the horse both have their uses and limitations, not only in this county and country, but abroad. There are uses in which the motor can and does excel the horse, and there are branches of work in which the horse undoubtedly rises superior to its mechanical competitor, and more it would be able successfully to accomplish were it given equal consideration to that accorded schemes formulated to facilitate the progress and development of the motor vehicle.

"The horse has not been superseded on the highways so much because of its incapacity to do the work of the motor-driven vehicle, as of the lack of consideration that has been shown for its existence in the construction and treatment of roads for mechanical use. The modern road is dangerous for horse-drawn traffic. And it is because of this fact, as well as that the average Devonshire farmer finds the horse more valuable to him in his land operations than the tractor, that there are so many protests against road schemes that do not make reasonable provision for their safe use by horse-drawn traffic. But apart from

(Continued at foot of first column next page.)

CLINICAL AND CASE REPORTS.

The Danger of the Tuberculous Udder.

By Frank Chambers, O.B.E., F.R.C.V.S.,
Wolverhampton.

On March 12th of last year I was instructed by the Local Authority to inspect the live stock on a farm where a dispersal sale was to take place. The inspection was a precaution taken to avoid the spread of foot-and-mouth disease, which was in the vicinity at the time. The cows were a good lot and the young stock looked especially well. In the course of my inspection I noticed that a six-year-old roan cow, in good condition, had a very much indurated and enlarged hind quarter. The secretion from the quarter was like sherry in appearance. Being suspicious of tuberculosis, I gave instructions that this cow was not to be exposed for sale and I took a sample of the secretion of the affected quarter for a biological test. The result of this test was positive. Proceedings were instituted against the owner and, although ignorance of the condition was pleaded, he was fined ten pounds and costs. Before the legal proceedings took place the owner decided to have the beast killed as he had to leave the farm. I was given an opportunity of seeing the *post-mortem*. The post-pharangeal precrural, bronchial, and mesenteric glands were affected. Both lungs contained large tuberculous cavities. The affected quarter of the udder contained caseating areas, and the supramammary gland was one large abscess.

On *November 12th* I was called in by another client to examine a yearling heifer that had been seen in a fit. When I arrived the heifer had apparently recovered, but she did not look very thrifty. I had seen six heifers, of which this was one, in April for the purpose of insurance inspection and valuation, and then they were all in excellent condition. I suggested that this heifer might be suffering from tuberculosis, but, in the absence of any definite symptoms, suggested that she should be kept in a loose box and watched for a few days. Exactly seven days later she was seen in another fit, which proved fatal.

Post-mortem revealed generalised tuberculosis and that the meninges over the cerebrum were affected. In January of this year I was again called in to see another of these heifers that was not doing well. She had a temperature of 105°, rapid respirations and persistent cough. I suggested tuberculosis and ordered destruction. *Post-mortem* verified the diagnosis. These heifers were the only ruminants on this particular section of the farm, and it was obvious that they must have been infected at the time of purchase. I enquired from the owner where he purchased them, and the reply was: "From Mr. X's farm, when he sold out." This was the farm where I had detected the cow with the tuberculous udder. The mystery was solved.

But a further chapter can be added to the story. Last week (February 11th, 1927) I was called to another farm to see a cow with mastitis, and when leaving the owner asked me to have a look at two yearling heifers that were not doing well. They both looked unthrifty, and one had well marked lack of control of her hind quarters. She swayed drunkenly when made to move. The owner volunteered the information that he had purchased both of them from "Mr. X's farm sale." Again another innocent victim of the roan cow! The heifer was killed the following day and revealed generalised tuberculosis, the meninges covering the spinal cord in the region of the lumbar vertebræ being visibly affected. The mesenteric glands in this case were all affected.

There can be no doubt that when the owner of the roan cow found that the udder was not what it should have been, he fed the milk to the calves that he was rearing, with the result that three have died or been killed as a result, and the others will no doubt follow suit before they are many years older. This cow would be producing milk rich in virulent tubercle bacilli before the milk became so bad that the owner would not put it with the rest. One can but surmise with horror the fate in store for the children who drank this milk, for it would be sold in the immediate vicinity of the farm, which was in a mining district.

A Case of Injury to the Scrotum in the Dog.

By Arthur New, M.R.C.V.S.,
Ashton-under-Lyne.

On January 8th, 1927, an Airedale dog was brought that had been bleeding for three days from a punctured wound through the scrotum, said to have been a cat scratch. The animal was in a very weak condition, and a quantity of blood escaped in a few minutes upon the operating table. I first thought it would be better to castrate the animal, but when I considered his weak condition I thought he would die under the operation. I took up a small piece of skin, including the puncture, with a pair of artery forceps and applied a catgut ligature. This effectually stopped the hæmorrhage and the scrotum became full of clotted blood. The dog was given nourishing food and tonics and the wound was antiseptisized twice daily. After the expiration of five days the strangulated portion of skin became detached and left a wound the size of a shilling which, under antiseptics

(*Continued from previous page.*)

these generalities, there are definite signs of more demand for horses of the Shire type. An examination of the market prices, to quote Sir Walter Gilbey, shows that good mares and geldings are fetching as much as £90 to £100, while it is now being proved that the English bred Shire horse can more than hold its own for transport services within limited areas.

"In view of these facts, it behoves the farmer to continue to breed the best types, not only to meet the growing demand for them in this country and replenishing the blood of overseas stocks, but to enable him to have another string to his bow in the way of helping him to be assured of a fairly regular income to meet his general expenses."

and astringent dressings, became contracted to the size of a threepenny piece, after a month's treatment, when the dog was sent home. The blood became absorbed from the scrotum and the animal regained his health and condition.

Poisonous Symptoms from Decomposing Roots and Young Grass in Dairy Cows.

By NEIL A. MACEWAN, Student, Royal (Dick) Veterinary College, Edinburgh.

This condition is met with in the early Spring just when the grass is freshening and while the cows are still in at night, and more often, when fodder is scarce and turnips are bulking largely in the ration. The roots are wasting and to save this waste they are fed in excess.

The cows are turned out to fresh grass in the morning. Nothing untoward is noticed at the evening milking, but the following morning the cows are badly off their milk, scouring badly, and very dull and stiff. The byre presents a really alarming picture and even when you have become familiar with the condition it is not to be treated lightly. The temperature is usually slightly above or below normal, the ears are cold, eyes dull and the pulse is slower and softer than normal sometimes. The fæces resemble a very soft bran mash, are ejected with force and, on standing for a few minutes, have a peculiar brown tinge over their surface. The animals that are lying down are very reluctant to rise.

I treated these cases with charcoal, camphoræ, chalk, sometimes with sodii bicarb. and catechu added, and hypodermic injections of strychnine. Recovery is usually rapid—a day or two.

(1) Out of 36 cows treated in one byre, one died;
(2) Out of 10 treated at another farm, none died, though these were the worst cases out of about 20.

There were 75 cows on No. 1 farm and 57 on farm No. 2.

On another farm the cows were seen ill on the Sunday morning. Two died during Sunday night and I arrived just in time to see the third one die. Eight others were treated and all recovered. I do not say they recovered because they were treated—it is difficult to tell. I keep the animals warm and tempt them to eat a little good hay.

R.C.V.S. LIBRARY.

The following books have been added to the Library during the past week:—Langeran: "Precis de Microscopie"; Merillat: "Poll Evil"; Wells: "Chemical Aspects of Immunity"; D'Herelle: "The Bacteriophage"; Bensley: "Anatomy of the Rabbit"; Reighard: "Anatomy of the Cat."

Books may be borrowed from the library by members of the College on payment of postage both ways. Apply to the Librarian, 10 Red Lion Square, London, W.C.1.

TRANSLATION.

An Attempt at Protective Inoculation with BCG against Tuberculous Infection in Man and Animals.*

By MM. A. CALMETTE, C. GUÉRIN, B. WEILL-HALLÉ, L. NÈGRE, A. BOQUET, WILBERT and TURPIN.

The Academy will recall that exactly a year ago we brought to its notice the experiments in protective inoculation against tuberculous infection which we had undertaken, first on animals of different sensitive species, and, since the beginning of 1922, on young children.

It is known that our efforts, and those of other experimenters, to employ bacilli killed or modified either by heat or by the action of chemical substances, had led to no satisfactory result. The same failure attended the effort to use as vaccines varieties of living bacilli, more or less attenuated, keeping to some degree the properties of causing tuberculosis, or still virulent for certain animal species, such, for example, as birds, or the small rodents.

Researches made by two of us in 1906 and 1907, and those made by Romer in 1908, on the effects of later bacillary infections on animals already contaminated showed, however, that immunity against tuberculosis, the resistance of which appears undeniable, is bound up with the presence in the body (immune or resisting later infections) of some bacillary elements in a state of latent life. Unfortunately, if these bacilli are virulent, they may, under the most varied influences, be multiplied, cause the formation of tubercles, and set up grave physiological disorders.

We considered, therefore, that we could not hope to procure immunity from tuberculosis except through a living virus, hereditarily deprived of its properties of causing tuberculosis by some laboratory process, such as that employed by Pasteur to transform the anthrax bacillus into a vaccinal virus.

It was necessary also that this virus, living, but not causing tuberculosis, should be harmless for all sensitive animal species, yet should preserve the power to immunise virgin organisms, that is to say, confer on them sufficient resistance to later infections, or modify favourably the results of such infections.

The very special method of attenuation which we employed is well known. Starting from an extremely virulent bacillus of bovine origin, we gave to calves from four to six months old an intravenous injection of three milligrammes of bacilli (dried, and weighed in the fresh state), causing an acute miliary tuberculosis which was fatal in four to five weeks. After 230 successive cultures made over 13 years on a very alkaline medium, with basis of ox-bile, we succeeded in suppressing completely and hereditarily in this microbe its property of causing tuberculosis. The microbe, however, remains toxic for tuberculous organisms, secretes tuberculin, and causes the formation of anti-bodies like the virulent bacilli. This

*Being the main features of a communication made to the Académie de Médecine, at a meeting on June 16th, 1925.

vaccinal bacillus which we named BCG (Bilié-Calmette-Guérin), whatever the route by which it is introduced—oral, intravenous or subcutaneous—shows itself perfectly harmless even up to doses near the toxic dose for healthy subjects (for the guinea-pig more than 20 milligrammes given subcutaneously of dried bacilli, weighed damp). Its elimination by the intestine or the mammary glands involves, as we have been able to verify experimentally, no danger of infection for man or any animal. We considered, therefore, that an attempt might be made, without disadvantage or risk, to use it to immunise young children exposed to family contamination.

In June, 1924, we were able to keep under our supervision 178 children vaccinated by two of us during the first half of 1922.

During the three years which followed vaccination (up to June 1st, 1925), 15 deaths among the 178 children were notified, none of which was due to a disease presumed to be tuberculosis. Until May-June, 1925, 94 of these children remained under our supervision. They all developed normally, and are in good health. Three of them live in permanent contact with their consumptive mother.

The mortality from all diseases other than tuberculosis among our 178 children vaccinated in 1922 was for those three years, 8·4 per cent.—a low figure. . . .

After our communication of June 24th, 1924, to the Academy, many doctors asked us to supply them with the vaccine BCG.

The technique employed was always the same:—Three ingestions each of one centigramme of living culture, dried, weighed in the fresh state, and made into an emulsion in a beaker with glass balls, in 2 cubic centimetres of a liquid made up of the following constituents:—Glycerine, 40 grammes; pure glucose, 10 grammes; distilled water, 1,000 grammes. The three doses of emulsion which had been prepared for less than 10 days were administered in a small spoonful of milk, half an hour after suckling, on the fourth, sixth and eighth days, or the fifth, seventh and ninth days after birth.

From July 1st, 1924, to June 1st, 1925, 2,070 newly-born babies were vaccinated in this way, not only in Paris, but throughout France and in Belgium.

By June 1st, 1925, we had, thanks to the friendly assistance of our colleagues and correspondents, succeeded in obtaining precise information about 423 of those children who had been vaccinated between July and December, 1924, and whose vaccination therefore dated back six months. One hundred and thirty-seven of them (32·6 per cent.) had been or remained exposed to family contamination, 86 through their tuberculous mothers. By June 1st, 1925, none of them had succumbed to a disease presumed to be tuberculous.

To form as accurate a judgment as possible on the practical value of preventive vaccination against tuberculous infection, we had recourse to two sources of information, one clinical, the other experimental. Both furnished documents equally conclusive. . . .

[The authors here give statistics furnished by medical institutions in England, France and Belgium, on which they base their conclusion in the next paragraph.]

We may then view as appreciably accurate the fact that every child born of a tuberculous mother, and not separated from her, has at least one chance out of four (in certain conditions, for example in Paris, three chances out of four) of succumbing to bacillary infection in the first year of its life.

A comparison of the death-rate from tuberculosis, which was zero for those children that had been vaccinated in 1922; at most ·5 per cent. for children vaccinated between July 1st and November 30th, 1924; zero also for those among them, 137 in number, who lived from birth more or less constantly exposed to family contagion, is then manifestly in favour of preventive vaccination.

Experiments on monkeys, which one of us was able to undertake since the Autumn of 1923 at the Research Centre created by the Pasteur Institute at Kindia (Guinea, French West Africa), furnished results quite as conclusive. . . .

In the same cage were grouped:—

(*a*) One or several vaccinated monkeys (either by five injections each at 48 hours interval of five centigrammes of BCG; or by a single subcutaneous injection of five centigrammes;

(*b*) One or several monkeys infected by the oral route;

(*c*) One or several monkeys as controls, not vaccinated, and not artificially infected.

This was done for 15 chimpanzees, of which three were vaccinated, five infected, and seven controls; and for 59 pithecinæ, of which 19 were vaccinated, 20 infected, and 20 controls.

None of the monkeys that had been vaccinated for not more than a year died with tuberculous lesions, whilst all the infected monkeys and the controls contracted tuberculosis and died after intervals varying from two to five months.

These experiments furnished new proofs that BCG is completely innocuous for every kind of monkey we had at our disposal. They showed that monkeys of all ages, even adult chimpanzees, could easily be rendered immune for more than a year by the administration by ingestion of five doses, each five centigrammes, of BCG at intervals of 48 hours, and that it is possible to maintain immunity against continuous infection through cohabitation by renewing each year the absorption by the oral route of the same doses of BCG. . . .

Experiments on bovines and on monkeys tend, therefore, to prove, more manifestly even than clinical observations, the completely innocuous nature of the vaccinal culture BCG, and its efficacy in protective inoculation.

(Ex. *Rec. Méd. Vét.*, Tome cii, No. 3, 15 Fév., 1926. pp. 79-87.) R. L. H.

DIVISIONAL REPORTS.

Central Division.

DISCUSSION ON THE CONTROL OF TUBERCULIN TEST REACTORS.

(*Continued from page* 205.)

Major REES-MOGG: I am afraid that, while I admire Mr. Perryman's ideals, I must express the opinion that they are absolutely impossible of attainment at present. Forty per cent. of the cows are tuberculous, and how many of these are giving tuberculous milk? Mr. Perryman says they all ought to be branded, but what about it when they are branded? You are only issuing a sentence of death with a stay of execution for a few years.

If those strong regulations came in no one would go in for keeping cows at all and there would be a great shortage of milk. Just because a cow reacts to the test it does not mean that she is giving tuberculous milk.

Tuberculosis and glanders are not to be viewed in the same light. Glanders in the human subject is always fatal, whereas tuberculosis in the human being is not by any means always fatal. It is absolutely impossible for 90 per cent. of the farmers in this country to keep their animals isolated—they have not got the buildings, they have not got the fields and they have not got the men.

Professor MACQUEEN: Might I ask whether there is any representative from the "National" here who can explain what they mean by control? Otherwise, we seem to be sawing the air. I fail to see what we are going to gain by a discussion on a matter of this kind unless we have some explanation of the object.

I listened patiently to Mr. Perryman's altruistic oration, but he did not convince me. It is really a sort of pleading for the scheduling of tuberculosis, and that is a matter for the Government. I fail to see what the veterinary surgeon has to do with control. He should discharge his obligation to his client; test the animal, if he is asked to do so, but he has nothing to do with its disposal. The moment the veterinary surgeon takes the rôle of the policeman, he loses his professional respect and dignity, if he ever had any. (Laughter).

Professor WOOLDRIDGE: This subject was transmitted by the North of England Division to the "National" for its consideration, and the "National" thought that the subject was far too big for it to undertake to express any opinion upon until the views of the various Divisions had been obtained. The wording is the wording of the North of England Division and each Division or Society is open to interpret it as it wishes and, if they desire to do so, to forward their opinion to the "National," who will then discuss the matter in the light of the opinions thus obtained.

Professor MACQUEEN moved: "That the time is inopportune for exercising any form of control over cows reacting to the tuberculin test." The motion having been seconded by Mr. Trewin,

Mr. GRAY said: Are we to look at this matter as individuals, or as a profession; for our own private interests, or for the good of the public? The veterinary profession must look at this question as a whole, because the public look to us for their protection. I think it is our duty to advise the Government what should be done: the Government will please itself whether or not it puts our views into execution. How are you going to eliminate tuberculosis from this country unless you control it? As it is at present, there is no control—no protection for the purchaser against the unscrupulous vendor of tuberculous cattle. Many people test their herds, eliminate the reactors, and thereby scatter the disease.

I say that the time has come when this profession should have a voice in the control of this disease. In the U.S.A. they are rapidly eradicating tuberculosis from their herds and so far as they have gone (they have tested some millions) their efforts have been a pronounced success. The consequences of the reduction of tuberculosis in the cattle population of that country have been far-reaching. There has been a marked decline of tuberculosis in mankind, also in pigs.

If we look at this problem from our own point of view only, we deserve the opprobrium of the public. (Hear, hear). We are the first line of public health defence; if we eliminate this disease from animals, man cannot contract it from animals and there our responsibility ends. I think that all cattle should be tested and at least branded if they react, as the first step to eradication of tuberculosis. Unless this is done, we are not going to make any advance in its eradication.

This Tuberculosis Order is a waste of public money. We get as many samples of tuberculous milk in London as we did before the Order was introduced. We compensate the man who has let his tuberculous animal do all the damage it can, and the first thing to be considered is, why should a man be compensated for letting his tuberculous animal do its worst? I think he ought to be prosecuted for letting it get to that stage.

I agree with Mr. Perryman; this is a matter for the public, and it is our duty to do all we possibly can for the public.

Mr. PERRYMAN proposed as an Amendment, and it was seconded by Mr. GRAY: "That the members of the Central Veterinary Society are of opinion that the time has now come when all reactors to the tuberculin test should be controlled by the Government."

Professor WOOLDRIDGE: I would suggest that you vote on the primary question in the first instance and, if you so wish, it might then be followed by such a resolution as this. I cannot think that anybody would disagree with Mr. Perryman's resolution.

Professor MACQUEEN: If that Amendment is put as the substantive motion, I withdraw my proposal, for I am quite in favour of that, that we should do all we can to aid the Government; but I do not think that we should interfere in the control. We should aid

the Government all we can, that is, provided the Government ask us to do so.

After further discussion, it was decided to vote on the motion as originally proposed by Professor MacQueen: "That the time is inopportune for exercising any form of control over cows reacting to the tuberculin test."

The motion having been carried, the PRESIDENT said: In that case, gentlemen, the second point sent for our consideration by the "National" does not arise.

The next item on the agenda is the presentation of a paper by Captain S. J. Motton, entitled "Tuberculin Testing (with special reference to the double intradermal test) from the practitioner's standpoint." It is my pleasure to introduce to you Captain Motton, who has travelled all the way from Penzance to give us the benefit of his entensive experience in this connection. I will now ask him to read his paper. (Applause).

[Captain Motton's paper, together with the discussion upon it, which was opened by Captain Townson, will appear in an early issue of the *Record*.—Ed.].

The proceedings terminated with the passing of hearty votes of thanks to the essayist, to the opener of the discussion and to the President for his conduct of the meeting.

J. F. MACDONALD, *Hon. Secretary.*

The West of Scotland Division.

"INFORMAL MEETING" AT GLASGOW.

The second of the series of informal meetings inaugurated by Dr. Whitehouse this winter, was held in the Board Room of the Glasgow Veterinary College on Saturday, 4th December, at 6 p.m.

The following members were in attendance under the Chairmanship of Dr. Whitehouse: Messrs. H. Begg, Hamilton; D. Campbell, Rutherglen; James Laird, Kilmarnock; James Macfarlane and Robert Mitchell, Glasgow. Apology for the non-attendance of Mr. G. W. Weir, who had unfortunately that morning received an injury to one of his fingers, was tendered to the meeting by Mr. James Macfarlane, who undertook the duties of Secretary *pro. tem.*

The following new members, having been proposed at the previous meeting, were duly elected: Messrs. Geo. Inglis, Alloa; James F. Taylor, Cathkin; and Wm. Harley, Hamilton. On the motion of Mr. H. BEGG, seconded by Mr. D. CAMPBELL, H. Begg, jr., Strathaven, and John Weir, County Offices, Hamilton, were nominated for membership. The date of the next meeting, which is the annual one, and at which office-bearers for the ensuing twelve months are elected, was fixed for Wednesday, the 19th January, 1927, and if it could be arranged it was to be held in the Royal Hotel, Sauchiehall Street, at 3-30 p.m., the members to partake of tea afterwards and spend a social hour. The only other official business was to report to the meeting that the Division's resolution, passed at the previous meeting, had been forwarded by Mr. Weir to the Secretary of the N.V.M.A. and its receipt had been duly acknowledged.

Dr. WHITEHOUSE then called on the members to bring forward subjects for discussion and the following is the writer's recollection of what took place, compiled after a week had elapsed with only a few pencilled jottings to guide him.

During the tea we had discussed the "Trojan Bull" case and the concensus of opinion was that it was surprising what cattle could and did swallow. Mr. LAIRD described how, on being called out to a cow that was badly "tinged" or swollen, he had successfully passed an instrument called the "Tympanum" and the animal was afforded relief (this instrument is a probang with a joint on the end, so that when it reaches the stomach it curls upward to allow of the free passage of gases). To his dismay, on withdrawing the instrument only half of it came away. As he could not locate its presence in the œsophagus he had to perform rumenotomy and the animal made an uneventful recovery. Mr. BEGG said that, whilst in practice, he operated latterly by making a bold incision right through skin and muscle into the rumen, then he put five strong interrupted sutures from the outside inwards, including the lower lip of the rumen and allowed the wound to heal by granulation, afterwards putting the animal in an end stall with the wound side next the wall. He once had to operate on three cows at one time, as the herd had been put to graze on wet clover. He had greater success by this method and less fear of peritonitis setting in afterwards.

The question of the quantity of food to remove was raised by Dr. WHITEHOUSE, who said that in the United States they liked practically to empty the rumen, but the opinion of those present was that only sufficient food, to bring the contents slightly below normal, should be removed.

The great value of the use of "slings" in horse practice was next raised. Dr. WHITEHOUSE said that one method of raising a horse was to put on his collar and, after passing a long rope round the buttocks and through the collar, to get the animal into a sitting up position and exert pressure forward either by the yoking in of another horse or by human power. Nearly all present said that they now used a long rope, doubled and put on the shoulders like a collar, then taking it between the fore-legs and bringing it up over the chest and crossing it at the loins, then through between the thighs and bringing up over the hip, on the same side, passing below the already-crossed rope on the loins, and tieing the ends securely to the rope on the withers, first drawing the rope ends as tight as possible. Next the hook of the pulley is inserted into all four strands as they cross over the loins, and the animal is rasied. The advantage is that the horse balances himself automatically. Mr. Mitchell thought rope pulley blocks were best, but Mr. Macfarlane said he preferred a quick-action chain pulley. He once kept a horse with a kick on the inside of his tibia in slings for eight weeks and he came out sound and was put in a loose box. In about a week he was

found down in his box with the leg dangling. The bone showed very little outward callous but had large canals through it where the fracture had healed and there had been a considerable infiltration.

Mr. BEGG said he was once called in to consult on a horse that had obvious hip joint lameness and had been twice setoned and blistered. He advised putting this animal in slings and in a month it was trotting sound and able to work. Latterly he owned as many as six sets of slings and hired them out at a charge of five shillings per week. Mr. MITCHELL said very cheap slinging harness could be made by using discarded "fire" hose. Dr. WHITEHOUSE said he liked a "bed" that was shaped and not the broad kind in general use in this country.

The question of the cleansing of cows was next introduced—the value of traction where possible and the care required not to bleed the cotyledons when removing by manipulation. The value of the douche as opposed to the pessary was extolled by Mr. BEGG, because of its far-reaching uniform effect, the benefit of the necessary stretching, warmth, and manipulation helped the womb to recover its tone. Mr. LAIRD said he found douches of weak solution of potassium permanganate specific in preventing metritis in such cases.

Mr. CAMPBELL next related and exhibited photographs of a tumour (afterwards proved to be a carcinoma) which he attempted to remove from the eye of a horse; but he found that it involved the bones of the head, so that the animal had to be destroyed. He recalled a peculiar case of lameness while on duty in France. The horse was dead lame on his near hind leg and he suspected fracture of the tibia, but there was no history of a kick nor was there any wound. Another veterinary officer called in at his lines that afternoon and he was certain the lameness arose from the foot. He had not long to wait for confirmation of his diagnosis, as the horse went down through the night and was found with the leg shattered.

Mr. Campbell recalled a case of impaction of the double colon which lasted five weeks before the death occurred. He had been attending a cow at this farm and was asked to see this horse casually, as he had been dull for over a week with occasional colicky pains.

Mr. MACFARLANE mentioned a similar case he had at one of his outlying stables that continued for the same time and latterly the bowel became so hard that he was convinced that it was a case of impaction caused by dustball, but at the *post-mortem* no dustball could be found. This animal always passed a little dry fæces and responded slightly to the purgative medicine it received, but despite continual dosing with nerve and general stimulants the bowel eventually ruptured. Mr. MITCHELL said he had heard of a veterinary surgeon who, when he could locate a dustball, spiked it and then attempted to shatter it by tapping on the spike. All present thought that even if this was done it would not end the trouble or save the horse's life, as the rough edges of the broken pieces would cling to and injure the mucous membrane. Mr. Mitchell, in a case of impaction, tried filling the bowels *per rectum* with cold water from a slow-running hose pipe. The animal got relief and a tremendous quantity of fæces came away. The animal worked for a month or so, but ultimately died rather suddenly from impaction due to dustball.

Mr. BEGG described what he considered was a case of asthma in a horse. This was a young Irish Gyp horse which a farmer client had bought from a dealer. The horse took the usual "dealer's cold," but instead of making a complete recovery, shortness of breath remained with him all winter and, despite feeding on straw and the administration of oil, he refused to thrive and was unfit for work. Immediately he was put to grass in the Spring he improved and, though advised to sell, the farmer kept him on and the following winter was a repetition of the first. He was sold the following autumn and Mr. Begg lost sight of the animal for three years, when another client asked him to examine a horse he had newly purchased and that was suffering from a cold. This proved to be the same horse and he was returned. The dealer, it seemed, had sold the horse several times, but latterly just hired him out to customers, and every winter he was useless for work.

A vote of thanks to Dr. Whitehouse for his conduct in the Chair brought a most enjoyable and interesting evening to a close.

JAS. MACFARLANE,
Hon. Secretary (*pro tem.*).

NOTANDA.

Antimony, in the form of its sulphide, has been known from very early times, more especially in Eastern countries, reference to it being made in the Old Testament. The ancient Latin name was "stibium."

* * * *

Œstrum appears in mares about 8 to 10 days after parturition; in cows 2 to 4 weeks; in sheep 6 to 8 weeks; in sows 4 to 5 weeks; and in bitches 3 to 5 months. It reappears in the non-pregnant mare each spring between March and June, and sometimes in the autumn (Sept. and Oct.); in the non-pregnant cow every 3 weeks; and in sheep, goats, and sows, every 18 days. It recurs in cats about three times a year.

* * * *

Œstrum endures for varying periods, thus:—In mares from 8 to 10 days; in cows 1 to 2 days; sheep 2 to 3 days; goats and sows 2 days; in bitches 9 to 14 days, and in cats 3 to 15 days.

* * * *

In profoundly comatose cases of milk fever, 5 cc. of a 1 : 1000 solution of adrenalin, given hypodermically after inflation of the udder, will cut short the hours of decumbency, and thus decrease the mortality of the serious cases. (*North Amer. Vet.*)

* * * *

The real chemical name of Analgene ($C_{18}H_{16}N_2O_2$) is orthoethoxyanamonobenzoylamidochinoline. Take a note of it!

H. K.

THIS YEAR'S HOLIDAY FIXTURE: TORQUAY, SEPT. 12-17.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th—N.V.M.A. Congress at Torquay.
March 17th—Annual General Meeting of the Western Counties Division at Exeter.

Clinical and Case Reports.

We desire to direct the attention of our readers to the fact that an article submitted for publication in the Clinical and Case Reports section of the *Veterinary Record* need not necessarily bear the signature of the writer, though its appearance is to be preferred and is essential so far as communications intended for insertion in the correspondence columns are concerned.

Contributors who are desirous that their names should be withheld in connection with the reproduction of their clinical articles must, however, forward their signatures for the information of the Editor.

The "Benevolent" Aid Performance.

We trust that all our readers within reasonable distance of London will patronise the amateur performance of that most entertaining play, "The Rotters," which Lt.-Col. P. J. Simpson is staging at the West Central Hall on the evening of Friday, April 8th, in aid of the Victoria Veterinary Benevolent Fund. Those who can attend are assured of an evening's thorough enjoyment, for the cast is a most competent one, but we appeal to all our members to support the Fund by making application for at least one ticket and, if they cannot use it themselves, sending it on to someone in a position to do so. Full particulars will be found in our advertisement columns.

R.C.V.S. Council Election.

We are advised that a further nomination has been made for election to the Council of the R.C.V.S. in that of Mr. J. O. Powley, M.R.C.V.S., of Knaresborough, Yorks, his proposers being Lt.-Col. J. W. Brittlebank and Mr. S. de M. Woodward.

R.C.V.S. Obituary.

Flanagan, Wilfrid Leo, Gwynfryn, Holyhead, Anglesey. Graduated Dublin, 11th December, 1912. Died 17th February, 1927. **Age 38.**

Howie, George, Sen., Alford, Aberdeenshire. Graduated Edinburgh, 24th April, 1886. Died 21st February, 1927.

Reid, Andrew, Albert Villa, Auchtermuchty, Fifeshire. Graduated H. and A. S. 1859, Edinburgh, April, 1880. Died 21st February, 1927.

Mr. George Howie, Senior.

We deeply regret to have to record the passing away of one of the most esteemed members of the veterinary profession and of the N.V.M.A., upon the Council of which body he served for many years, in Mr. George Howie, M.R.C.V.S., of Alford, Aberdeen.

Mr. Howie, whose death took place on Monday, 21st February in an Aberdeen nursing home, was 62 years of age. He had been ill for some time.

A son of the late Mr. George Howie, Turriff, Mr. Howie began his career as a chemist and then went to Edinburgh, where he attended the Royal Dick Veterinary College and qualified as a veterinary surgeon, with distinction, being gold medallist. After qualifying he practiced for some years in Fyvie, and 38 years ago Mr. Howie set up practice in Alford and enjoyed a very wide and high reputation as a veterinarian.

He had been vice-president of the N.V.M.A., and for many years was the efficient secretary of the North of Scotland Division of the N.V.M.A., to which he gave unstinted devotion, while he was one of the most regular attenders of the Annual Congresses of the parent Association.

As a practitioner of veterinary medicine and a devotee of research, Mr. Howie stood in the first rank, keeping himself abreast of the times with the most recent veterinary literature.

The deceased gentleman was particularly interested in the tuberculin test. He was extremely thorough in its application, and as a consequence there was no one on whose findings stock breeders placed greater reliance.

Mr. Howie was one of the most lovable of men, and greatly respected by the members of his profession throughout Great Britain—so, too, by the agricultural community and all classes in the district of Aberdeenshire, where he passed his life. The news of his death was received with widespread regret. Mr. Howie took a deep interest in the social life of the Alford district. A keen bowler, he was president of the local club last year. For many years, also, he had been an Elder of Alford U.F. Church.

Mr. Howie leaves a widow and a family of one son and one daughter.

Mr. Andrew Reid.

"Mr. Andrew Reid, a notable Fife veterinary surgeon, who practised his profession in Fife for well nigh 60 years, died yesterday at Edinburgh," says the *Dundee Courier* of 22nd February.

"A native of Dysart, Mr. Reid was educated at Leslie, and in 1859 graduated as a M.R.C.V.S. in the Dick College, under Mr. William Dick.

"He went to Auchtermuchty in the following year, and began practice there. He soon gathered round him an extensive clientele throughout Central Fife. He was most skilful and conscientious in the discharge of his duty, and won the esteem of his many clients.

"He retired a number of years ago, when he was succeeded by his younger son, Mr. David Reid, M.R.C.V.S., who eventually went into farming. At the end of last year deceased left Auchtermuchty to reside at Edinburgh with his only daughter.

"Mr. Reid, who was in his 90th year, is survived by a daughter and two sons, the elder being Mr. Robert Reid, M.R.C.V.S., Cupar, who retired a few months ago."

Young Practitioner's Tragic Death.

"That death was due to tetanus, the result of an accident, was the verdict returned at an inquest held in the Dublin Morgue yesterday on Felix McKenna (32), a veterinary surgeon, at Castleblayney, Co. Monaghan," says the *Irish Times* of 22nd February.

"Mrs. Ellen Smith, of Moy House, Co. Monaghan, mother of the deceased man, said that she had heard that her son met with an accident by falling off his bicycle, and that he had hurt his nose.

"Dr. James Meenan, 28 Fitzwilliam square, Dublin, said that Mr. McKenna came under his care in a city nursing home last Friday. He was then suffering from lockjaw, and he died on the following day. A *post-mortem* examination revealed a small abrasion on the nose, which was probably infected by the bacillus. Death was due to lockjaw.

"The Coroner (Dr. Louis Byrne) said that this was all the evidence, and he assumed that the deceased man fell off his bicycle."

Concerning Tuberculous Cattle.

At a meeting of the Central Council of Milk Recording Societies held in London on 24th February, Mr. J. McGregor, of Leeds University, urged that the inspection of cattle for tuberculosis should be a county responsibility.

The Chairman (Mr. Harold Jackson) announced the receipt of a letter from the Ministry of Agriculture stating that it would be quite in order for any society to appoint a special veterinary surgeon for the testing of cattle for Grade A milk, and to make the necessary arrangement with him; and that subject to such veterinary surgeons being approved by the Ministry their reports on the testing of herds would be officially accepted. Mr. Jackson suggested that this was a matter for each society to settle for itself, and said that the cost per head would depend upon the size of the herds.

Mr. McGregor pointed out that in two Scottish counties the entire cost of such inspections was borne by the local authorities. It had been shown that in the West Riding of Yorkshire the appointment of a chief veterinary officer, with the necessary assistants, would be less expensive than the present system whereby independent veterinary surgeons were employed.

The West Riding farmer who paid a veterinary surgeon to make two inspections a year of a herd of thirty cows was involved in an expenditure of something between £20 and £32, and in view of the large proportion of infants who died from tuberculosis contracted from milk, he considered it would be more satisfactory for County Councils to undertake this inspection (and thus help the farmers to eradicate tuberculosis from the cow) than to spend—as the West Riding County Council was spending—large sums in the provision of institutions for the treatment of tuberculosis.

It was decided, after further discussion, to collect additional information as to costs, etc., which would be forwarded to the various societies.—*Yorkshire Post.*

. . . . . .

The report of the Kent County Council Diseases of Animals Sub-Committee states that during the sixteen months ended December 31st, under the Tuberculosis Order, 434 reports of suspected disease were received, veterinary inspectors examined 7,870 animals, 280 animals upon *post-mortem* were found to be diseased, 289 animals, for which compensation was paid, were slaughtered, and compensaton aggregating £1,267 8s. 9d. was paid.

. . . . . .

At the Lanchester Police Court on 26th February, John Quince, of Quebec, was, says the *Newcastle Daily Journal*, charged with a breach of the Tuberculosis Order, 1925.

Mr. W. H. Bell, of Sunderland, who prosecuted on behalf of the Durham County Council, said that the case arose from the fact that a sample of milk taken at South Shields was traced to the defendant's farm, as it was found to be tuberculous. In consequence Mr. T. Wilkinson, veterinary surgeon, of Lanchester, the inspector appointed by the County Council, went to Quince's farm, where he found two cows in an advanced stage of tuberculosis.

After Mr. Wilkinson saw the cows and made his report the animals were slaughtered. What Mr. Wilkinson found more than confirmed his previous opinion. The only thing that they were concerned with was whether defendant had reasonable knowledge that the cows were in that condition. On January 25th, Sergeant Fell went to the farm, and thereupon Quince reported the animals as tuberculous, but he should have done so long before that date.

Mr. Aynsley, who defended, said surely the reasonable interpretation of that Order was that no farmer or dairyman was under any obligation to report to the inspector unless he had reasonable grounds for knowledge that he had got an animal in his possession that was tuberculous. Defendant was a farmer, and not a veterinary expert. Quince had no reason to suspect that any of his herd was suffering from tuberculosis.

After the Bench had retired the Chairman said that they had come to the conclusion that the farmer had no reasonable grounds for thinking that the animals were suffering from tuberculosis, and therefore the case would be dismissed.

A second charge was adjourned for eight weeks, so that Mr. Bell might consult his clients.

The Terms of a Borough Appointment.

At a recent meeting of the Fulham Borough Council, the Works and Highways Committee recommended that Mr. A. Case, M.R.C.V.S., be re-appointed as the Council's veterinary surgeon for the twelve months ending 31st March, 1928, on the following terms and conditions: (*a*) £1 1s. per horse per annum, to cover all necessary professional attendance and medicine, and reports with reference thereto; (*b*) £1 1s. for the examination of each horse actually purchased by the Council; (*c*) No charge for the examination of horses at view committees which are subsequently returned to their owners.

Mr. Lancaster asked what was the reason for increasing the fees, seeing that the number of horses was less. It was a rather strange doctrine for the "other side" to advocate that because there was less work to do the fees should be increased to make the salary practically the same. If it was to make a general practice he had no objection. It seemed to be setting up a precedent—more money for less work. Personally, he agreed to the principle—(laughter)—that when they brought in machinery to make work easier, and to displace men, they should reduce the hours and keep the money the same, by which means they would not be causing any hardship.

Mr. Pratt, chairman of the Works Committee, in reply, said he expected a "to do" on the subject. He (the speaker) contended that the veterinary surgeon had been grossly underpaid since the war, and his medicines had increased in cost by 100 per cent. He (Mr. Pratt) did not think any veterinary surgeon in London was paid at such a low rate as one guinea per horse, and he contended that the increase was just and reasonable. Mr. Pratt added: "It is merely eyewash on Mr. Lancaster's part for the purpose of publicity, but it does not hold water."

Alsatian Dogs.

In the House of Commons on Monday, Captain Hacking, Under-Secretary, Home Office, asked by Mr. Beckett whether, in view of the recent cases of savagery committed by Alsatians dogs towards children, he would consider banning or placing severe restrictions upon the ownership

of these animals, said: "There is no power to take any action of the nature suggested, and on the information before me I see no reason to suppose that the ordinary law as to dogs is not sufficient for the protection of the public.

Mr. Beckett asked whether the hon. gentleman had seen other cases reported in the Press that morning.

Captain Hacking: When an Alsatian dog bites anybody the fact is always advertised, but Alsatians are not the only dogs that bite.

Mr. Beckett: Is the hon. gentleman aware that Alsatians are only half dogs, the other half being wolf?

Captain Hacking: They were called wolfhounds originally, but not because they were bred from wolves, but because they were there to protect sheep from wolves. (Hear, hear, and laughter.)

H.M. Stationery Office Publications.

The undermentioned have been published during the week. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28 Abingdon Street, S.W.1; Cardiff: 1 St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120 George Street.

	Price Net. s. d.	*Post Free.* s. d.
AGRICULTURE AND FISHERIES, MINISTRY OF:—		
Foot-and-Mouth Disease Research Committee. Second Progress Report	3 0	3 2
WAR OFFICE:—		
Regulations for the Medical Services of the Army, 1923. Amendments. January, 1927	0 1	0 1½

Army Veterinary Service.

London Gazette. War Office. Regular Army Reserve of Officers.

February 22nd.—Major W. Jowett, F.R.C.V.S., resigns his commission (January 29th), and retains the rank of Major.

Shire Horses.

The sales of Shire horses at the Royal Agricultural Hall, Islington, N., justified the brighter view which has been taken of the future of this fine old breed. Stallions and geldings were in keen demand, and sold well. Messrs. A. H. Clark's (Spalding) second prize two-years-old stallion, Moulton Conqueror made £525, and Mr. A. Luckin's (Wisborough Green, Sussex) three-years-old Orfold Friar, £420. Two other stallions realised £157 10s. each, and one gelding £210.

At the annual meeting of the Society Sir Walter Gilbey was elected vice-president. He will be president for the jubilee show next year, when he will succeed Mrs. Stanton, of Snelston Hall, Ashbourne, Derbyshire, who has now become the first woman president. Sir Walter's election is a special compliment to him, as well as to the memory of his father, the late Sir Walter, one of the founders of the Society.

Under the auspices of the London Animal Welfare Society, an illustrated lecture entitled "Animal Welfare from the Point of View of the Veterinary Profession," will be given by Major F. T. G. Hobday C.M.G., F.R.C.V.S., F.R.S.E., in the Anatomy Theatre, University College, Gower Street, W.C., on Thursday next at 5 p.m. Admission is free without ticket.

Horses Replacing Motor-lorries.

"More horses are now on the London streets than for many years past, and the demand is growing," says the *Daily Express*. "Owing to increased motor taxation, heavy motor-lorries are being replaced by horse-drawn vehicles. Firms that employ carts and lorries claim that horse power is cheaper than motor power in existing circumstances, for while it is held up in congested streets a horse is resting and refreshing itself, whereas a motor-lorry is simply eating petrol. The cart horse is therefore coming into its own again, and many an old horse that had earned retirement in the country is being put into harness on busy streets once more.

"The manager of the Elephant and Castle Repository Co., Ltd., one of the largest horse-dealing firms, and the secretary of the National Farmers' Union both said to a *Daily Express* representative that there had been an increased demand for horses recently.

"The same state of affairs was reported by the secretary of the Shire Horse Society. 'We seem to be going back to pre-war conditions,' he said. 'Prices of horses, too, are going back to the pre-war level. It is not only in London, but in all the big towns, particularly Manchester and Liverpool.'"

Tuberculous Cows.

"Mr. W. Lyle Stewart, veterinary science adviser, Armstrong College, in an address last evening," says the *Yorkshire Post* of February 22nd, "at a meeting of the Darlington branch of the National Farmers' Union, said that there were three millions of cows giving milk in this country, and probably one million of these were affected in one way or other by tuberculosis. But they did not know and had no means of estimating the loss which occurred annually to the farming industry from this disease. The presence of tuberculosis rendered animals more liable to other diseases, and further, a herd affected by tuberculosis was more expensive to keep going than a healthy herd. In many parts of the country cows were kept under conditions which were extremely bad. They were over-crowded in dark and ill-ventilated buildings, and could not miss disease. Tuberculosis was a key disease, and its prevention would result in the saving of a great deal of life every year. Farmers could do much to get rid of the disease by giving more attention to the conditions under which the animals were kept, and exercising more care when introducing new animals to the herd."

Comedy of a Donkey.

"The comedy of a donkey, first staged in July last, is," says a recent issue of the *Evening News*, "having a long run.

"Its owner, Ernest Salmon, who gave children penny rides in Hadley Woods, was charged with cruelty, and the donkey was handed over to Inspector Beesley, of the Equine Defence League to be taken to the Cricklewood home of rest.

"A search for the animal followed, without success, but on Barnet Fair day, September 4th, the inspector saw Salmon with a herd of donkeys.

He picked out one and took it to the home, but Mrs. Fairbrother, of New Barnet, then sued Salmon for the return of her donkey, and Salmon said this was the one seized.

"Inspector Beesley told how he recognised the donkey, which had now been destroyed.

"Judge Crawford said this was apparently Mrs. Fairbrother's donkey, taken in error. She might have a case against the over-zealous inspector of this well-meaning league, but the action against Salmon must be dismissed, with costs.

Sheep Worrying.

"It cannot be regarded as unreasonable that owners of dogs should be required to keep their canine pets or companions under such restraint as shall ensure the immunity of flocks of sheep from attack and injury," says the agricultural correspondent of *The Times*. "There have been many complaints of sheep being chased and worried by dogs in different parts of the country, and although it is believed that evidence could be adduced sufficient to justify suitable action if farmers were to organize with this end in view, it appears that such apathy obtains respecting this disagreeable subject as to make successful intervention by central bodies like the N.F.U. improbable. Sheep worrying, even at infrequent intervals, is so serious and cruel a business that prevention is the object at which those concerned should aim. The farmer whose flock is ravaged can possibly be compensated for his material loss, but that is inadequate to meet the case when regard is had to the suffering inflicted upon the helpless victims of the attack, sometimes at or near lambing time. No one wishes to interfere needlessly with lovers of dogs, but it is expedient and reasonable that the animals should be prevented from doing harm to sheep and other kinds of stock."

Sex Determination in Cattle.—Within the next few years research workers in Scotland might be expected to have solved the problem of sex determination among cattle, said Sir Robert Greig, chairman of the Board of Agriculture for Scotland, in a recent address at Aberdeen, to members of the Former Students' Association of the North of Scotland College of Agriculture and of the University Agricultural Society.

Horse v. Machine.—Notwithstanding the all conquering march of the motor-car, in Germany at least the horse still holds his own for certain purposes. In Berlin to-day some 76,000 horses are still used in trade and industry—chiefly, of course, for heavy draught work.

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Veterinary Advisors, Ministry of Health.

To the Editor of The Veterinary Record.

Sir,—I desire to emphasise the remarks of Professor Wooldridge regarding the appointment of veterinary advisors on the staff of the Ministry of Health. It is two years since an editorial was written in the *Veterinary Record* on the subject (14th February, 1925), but beyond a spasm no action has taken place.

It is well known that meat traders are asking for uniformity in inspection of meat. Personally, I consider that an official with practical experience should pay visits to all public abattoirs during slaughtering, ascertain from personal observation the standard adopted and, if necessary, correct it.

Secondly, in cases of dispute where meat has been passed by one official and condemned by another—as is alleged, in one instance, to have occurred in the same town, where a conviction was nevertheless said to have been recorded,—I consider an official of the Ministry of Health should adjudicate.

The Milk and Dairies Order offers equal opportunities for co-ordination. The inspection of premises under the Milk (Special Designations) Order and checking of certificates of tuberculin testing should be referred, in my opinion, to the veterinary advisor.

Not being a statutory officer a veterinary surgeon in public health work ploughs a lonely furrow, so that it would be an advantage if he felt that there was someone to whom he could appeal when in difficulties.

Dentists and osteopaths have come into recognition, while the veterinary profession, of older standing, appears to be unable to overcome the opprobrium of the word "Vet."—Yours faithfully, J. Pollard.

Halifax,
23*rd February*, 1927.

The Use of Morphia in Canine Practice.

To the Editor of The Veterinary Record.

Sir,—I read with interest the clinical article on the tolerance and idiosyncrasy of morphia in the dog, in the current issue of the *Record*. A point I have never seen noted is the use of morphia in the so-called false epilepsy of our canine patients. In one case I have in mind a dog was affected with these "fits" due to overfeeding. No other form of morphia being available, 30 minims of morphia and atropine were given and the patient fell asleep for 20 hours. In the same connection, it is interesting to note that apomorphine is useless in such cases. The best emetic, I found, was ordinary washing soda, a piece the size of a pea emptying the stomach in less than a minute.—Yours faithfully, John M. Buchanan, M.R.C.V.S.

Glasgow,
28*th February*, 1927.

"Veterinary Journal" Clean Milk and Humane Slaughtering Demonstrations.

To the Editor of The Veterinary Record.

Dear Sir,—Referring to the preliminary notice of the above which you kindly inserted in last week's *Veterinary Record*,—in order to add more interest for the members of the profession and students who will accompany the party visiting the Pasteurising and Milk Bottling Depôt of the United Dairies' Company at Streatham, on the afternoon of Thursday, March 17th, I have arranged at another place in the neighbourhood for a practical demonstration of the application of Mr. Weinberg's humane revolving machine, which is designed with the object of doing away with the present objectionable (and often cruel) method of casting and securing cattle killed under the Jewish laws. Several bullocks will be killed, and the party will have every opportunity to closely inspect the whole process and the result.

The party will meet at 10 Red Lion Square, Holborn, at 1-15 and proceed to the various places by charabanc, returning about 5-30 or 6 o'clock, and, by the kind invitation of the directors, they will be the guests of the United Dairies at tea time. The cost will be trivial but names must reach me before Saturday, March 12th, so that the charabanc accommodation can be arranged for.—Yours faithfully, Frederick Hobday.

165 Church Street,
Kensington, W.8.

The Editor acknowledges the receipt of the fol'owing:—
Report of the Annual Meeting of the North Midland Division from Mr. J. S. Lloyd, Hon. Secretary.

National Veterinary Medical Association of Great Britain and Ireland.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

All communications relative to the literary side of the Veterinary Record must be addressed to the Assistant Editor, "Veterinary Record," 10 Gray's Inn Square, W.C.1